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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/511,784 | 10/15/2004 | William R Priedeman JR. | S697.12-0065 | 4209 |
| 164 7590 02/13/2008 KINNEY & LANGE, P.A. THE KINNEY & LANGE BUILDING 312 SOUTH THIRD STREET MINNEAPOLIS, MN 55415-1002 | | | EXAMINER GOFF II, JOHN L | |
| | | | ART UNIT 1791 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/511,784

Applicant(s)

PRIEDEMAN ET AL.

Examiner

John L. Goff

Art Unit

1791

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,8,10,11,16,18-23,27,28,33 and 36-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,10,11,16,18-23,27,28,33 and 36-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/11/05, 9/26/05, 8/6/07, 8/28/07
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1-3, 8, 10, 11, 16, 18, 21, 22, 27, 28, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (Specification pages 1-4 and 8) as exemplified in part by Crump (U.S. Patent 5,121,329) in view of Joseph et al. (U.S. Patent 3,807,054) or Edmonds (U.S. Patent 5,448,838).

The admitted prior art discloses it was known to make a three-dimensional object by building an object from a thermoplastic modeling material using fused deposition molding wherein the built object has an object surface formed of the modeling material including an object surface formed of a plurality of layers as exemplified by Crump (Page 1, line 6 - Page 2,

line 15 of the specification and Column 3, lines 64-66 of Crump). The admitted prior art further teaches the object surface formed of the modeling material exhibits a surface roughness effect that detracts aesthetically wherein manual/by hand techniques were known for smoothing the object surface (Page 2, line 16 - Page 3, line 17 of the specification). It is extremely well known in the art that thermoplastic object surfaces formed as having a surface roughness may be smoothed by exposing the object to vapors of a solvent such as methylene chloride that transiently softens the thermoplastic material at the object surface and reflows the softened thermoplastic material to uniformly smooth the object surface as shown by Joseph or Edmonds (Figure 6 and Column 1, lines 5-11 and Column 2, lines 3-11 and Column 4, lines 1-17 of Joseph and Figure 1 and Column 1, lines 6-14 and Column 2, lines 6-10 and 52-56 and Column 3, lines 1-8 of Edmonds), it being further noted the admitted prior art recognizes smoothing plastics with vapors of a solvent was known (Page 3, line 18 - Page 4, line 20 of the specification). It would have been obvious to one of ordinary skill in the art at the time the invention was made to smooth the object surface as taught by the admitted prior art as exemplified in part by Crump by using vapors of a solvent as was well known and shown by Joseph or Edmonds to easily and uniformly smooth the object surface without having to manually do so by hand.

Regarding claim 8, the length of time the object is exposed to the solvent vapors as taught by the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds is considered selected as a function of the concentration of the solvent vapors prior to exposing the object.

Regarding claims 10, 11, 27, and 28, the admitted prior art discloses known solvent masking substances include gum, waxes, pastes, adhesives or masking tape (Page 8, lines 24-26).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds known solvent masking substances such as those shown by the admitted prior art as a function of inhibiting smoothing in areas where aesthetically surface roughness or other non-smoothing effect is desired wherein the specific technique for applying the substances which are similar to the thermoplastic molding material would have included the same fused deposition molding equipment as used to apply the thermoplastic molding material such that further equipment is not required. Regarding claims 16, 18, and 33, the admitted prior art discloses the fused deposition molding equipment includes a computer aided machine (CAM) operating in conjunction with a computer aided design procedure (CAD) as exemplified in Crump (Column 1, lines 15-24) which computers are considered to create a digital representation of the final three-dimensional object and control the fused deposition molding equipment to form the final three-dimensional object. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the solvent masking substances as taught by the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds would be represented in the software used in the CAD/CAM system such that the system is capable of modeling the final three dimensional object and controlling the equipment to form the object which software is considered to create the digital representation of the object surface area from any of the two well known input modeling functions, e.g. an algorithm or input from the user, e.g. via a haptic input interface.

4. Claims 4, 5, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art as exemplified in part by Crump and Joseph or Edmonds as applied to claims 1-3, 8, 10, 11, 16, 18, 21, 22, 27, 28, and 33 above, and further in view of Dahlin et al. (U.S. Patent 6,022,207).

The admitted prior art as exemplified in part by Crump and Joseph or Edmonds teach all of the limitations in claims 4, 5, and 23 except for a teaching of the specific thermoplastic material used, it being noted the admitted prior art makes reference to Dahlin as a known rapid prototyping technique. Dahlin directed to rapid prototyping similar to the admitted prior art discloses a particularly suitable thermoplastic is ABS (Column 4, lines 3-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the thermoplastic material in the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds ABS a known suitable material such as shown by Dahlin.

5. Claims 19, 20, 36-39, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art as exemplified in part by Crump and Joseph or Edmonds as applied to claims 1-3, 8, 10, 11, 16, 18, 21, 22, 27, 28, and 33 above, and further in view of Leyden et al. (U.S. Patent 5,143,663).

The admitted prior art as exemplified in part by Crump and Joseph or Edmonds teach all of the limitations in claims 19, 20, 36-39, 41, and 42 except for a teaching of modifying an initial object representation to pre-distort certain features of the surface geometry, it being noted the CAD/CAM system taught by the admitted prior art as exemplified in part by Crump is considered to provide an initial object representation in a digital format wherein the initial object representation has a surface geometry, the object built in the building step has a geometry

defined according to the object representation, and the geometry attained following the exposing step approximately matches that of the initial object representation, and the admitted prior art makes reference to Leyden as a known rapid prototyping technique. Leyden directed to rapid prototyping similar to the admitted prior art discloses the object is built oversize to that after the surface roughness is removed the object will be the right size (Column 7, lines 25-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds a step of modifying the initial object representation to pre-distort certain features of the surface geometry so that after the surface roughness is removed the object will be the right size as shown by Leyden.

Regarding claim 37, the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds and Leyden is considered to identify features of the surface geometry for pre-distortion according to their radii of curvature.

6. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art as exemplified in part by Crump and Joseph or Edmonds and Leyden as applied to claims 19, 20, 36-39, 41, and 42 above, and further in view of Dahlin.

The admitted prior art as exemplified in part by Crump and Joseph or Edmonds and Leyden teach all of the limitations in claims 4, 5, and 23 except for a teaching of the specific thermoplastic material used, it being noted the admitted prior art makes reference to Dahlin as a known rapid prototyping technique. Dahlin directed to rapid prototyping similar to the admitted prior art discloses a particularly suitable thermoplastic is ABS (Column 4, lines 3-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as

the thermoplastic material in the admitted prior art as exemplified in part by Crump and as modified by Joseph or Edmonds and Leyden ABS a known suitable material such as shown by Dahlin.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is **(571) 272-1216**. The examiner can normally be reached on M-F (7:15 AM - 3:45 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John L. Goff/
Primary Examiner, Art Unit 1791